



THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)

ELIYAHOU HARARI, ROBERT D.)
NORMAN, and SANJAY MEHROTRA)

Serial No.: 08/931,133)

Filed: September 16, 1997)

For: FLASH EEPROM SYSTEM)

Group Art Unit: 2785

San Francisco, California

Hon. Commissioner of
Patents and Trademarks
Washington, D.C. 20231

SECOND PRELIMINARY AMENDMENT

Sir:

Please preliminarily amend the above-identified application, as follows:

IN THE SPECIFICATION:

Page 1, line 1, strike the title and substitute therefor
--MULTI-STATE FLASH EEPROM SYSTEM WITH CACHE MEMORY--.

Page 11, line 26, change "Harari" to --Harari, now patent no. 5,095,344,--.

Page 11, lines 28 and 29, strike "filed on the same day as the present application," and substitute the following therefore: --Serial No. 07/337,579, filed April 13, 1989, now abandoned,--.

Page 22, line 14, insert after "204,175" --now patent no. 5,095,344,--.

Page 22, line 16, change "Techniques." to --Techniques,
Serial No. 07/337,579, filed April 13, 1989, now abandoned.--

Page 26, line 3, insert a comma --,-- after "204,175" and
insert thereafter --now patent no. 5,095,344,--.

Page 26, strike all of line 4, and substitute the
following therefore: --Harari, Serial No. 07/337,579, filed April
13, 1989, now abandoned,--.

IN THE CLAIMS:

Add the following new claims:

--68. A method of writing data files into a system of
flash EEPROM cells that are programmable into more than two states
in order to store more than one bit of data per cell, comprising:

temporarily storing, in a cache memory, data files from
a host system intended for the flash EEPROM memory;

writing data files into the cache memory instead of the
flash EEPROM memory in response to a write request from the host
system;

determining the time since each data file was last
written into said cache memory; and

moving from the cache memory a data file having the
longest time since last written, when additional space for new data
files is required in the cache memory, into the flash EEPROM memory
by programming individual flash EEPROM cells into one of said more
than two programmable states.

69. A method of writing data files into a system of
flash EEPROM cells that are programmable into more than two states
in order to store more than one bit of data per cell, comprising:

temporarily storing, in a cache memory, data files from a host system intended for the flash EEprom memory;

writing data files into the cache memory instead of the flash EEprom memory in response to a write request from the host system;

storing, in a tag memory, the identity of data files and the time each data file was last written into said cache memory; and

by reference to the tag memory, moving a data file having the longest time since last written first from the cache memory to the flash EEprom when additional space for new data files is required in the cache memory, individual flash EEPROM cells being written into one of said more than two programmable states.

70. A method of writing data files into a system of flash EEprom cells that are programmable into more than two states in order to store more than one bit of data per cell, comprising:

temporarily storing, in a cache memory, data files from a host system intended for the flash EEprom memory;

in response to a write request from the host system, writing a data file either into the flash EEprom memory when a previous copy of said data file is not present in the cache memory, or into the cache memory when a previous copy of said data file is present in the cache memory;

moving a data file having the longest time since last written first from the cache memory to the flash EEprom memory when additional space for new data files is required in the cache memory, thereby substantially reducing the number of actual writes to the flash EEprom memory; and

wherein a data file is written into the flash EEPROM by programming individual cells thereof into one of said more than two programmable states.

71. A method of writing data files into a system of flash EEPROM cells that are programmable into more than two states in order to store more than one bit of data per cell, comprising:

temporarily storing, in a cache memory, data files from a host system intended for the flash EEPROM memory;

in response to a write request from the host system, writing a data file either into the flash EEPROM memory when said data file is last written after a predetermined period of time, or into the cache memory when said data file is last written within the predetermined period of time; and

moving from the cache memory a data file having the longest time since last written, when additional space for new data files is required in the cache memory, into the flash EEPROM memory by programming individual flash EEPROM cells into one of said more than two programmable states.

72. A method of writing data files into a system of flash EEPROM cells that are programmable into more than two states in order to store more than one bit of data per cell, comprising:

temporarily storing, in a cache memory, data files from a host system intended for the flash EEPROM memory,

storing, in a tag memory, the identity of data files and the time each data file was last written into said cache memory;

in response to a write request from the host system, writing a data file into the flash EEPROM memory when the data file

is not identified in the tag memory, or into the cache memory when the data file is identified in the tag memory;

by reference to the tag memory, moving data file having the longest time since last written first from the cache memory to the flash EEPROM memory when additional space for new data files is required in the cache memory; and

wherein a data file is written into the flash EEPROM by programming individual cells thereof into one of said more than two programmable states.--

REMARKS

By this amendment, claims are being added that are directed to the use of cache memory as part of a flash EEPROM system, similar to the existing claims 63-67, but with multi-state operation added. That is, each of the new claims additionally recites that the individual flash EEPROM cells are programmable into more than two states in order to store more than one bit of data per cell.

Although multi-state operation is mentioned in the present application specification, it is more completely discussed in two applications incorporated by reference into the specification at pages 11, 22 and 26. Since the referenced application serial no. 204,175 has issued as patent no. 5,095,344, the patent number is being added by this Amendment. The serial number of the second referenced application is also being added by this Amendment. The status of the second referenced application is that it has become abandoned in favor of a continuation-in-part application which matured into patent no. 5,172,338 and a division thereof into patent no. 5,163,021.

An Information Disclosure Statement is being filed herewith, with copies of the cited references. The 3 patents identified in the preceding paragraph are included.

An early examination and allowance of the present application are solicited.

Respectfully Submitted,

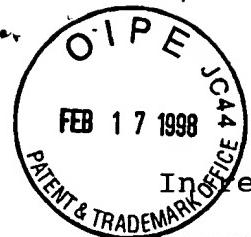
Dated: Feb. 11, 1998

Docket No.: HARI.006USG

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In re Patent Application of)

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Serial No.: 08/931,133)

Filed: September 18, 1997)

For: FLASH EEPROM SYSTEM)

Group Art Unit: 2785

San Francisco, California

Assistant Commissioner for Patents
Washington, D.C. 20231

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:
Assistant Commissioner of Patents, Washington, D.C. 20231 on
Feb. 13, 1998.

Brenda J. Dolly

Brenda J. Dolly 2/13/98
Signature Date

SECOND PRELIMINARY AMENDMENT TRANSMITTAL

Sir:

Transmitted herewith is a Second Preliminary Amendment in the captioned application.

A check in the amount of \$410.00 is enclosed to cover the fee for filing additional claims.

Also enclosed is an Information Disclosure Statement,

five sheets of PTO 1449, and three 3-ring binders containing the cited references.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment,

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to Deposit Account No. 13-1030. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

Dated: Feb. 11, 1998

Atty. Docket: HARI.006USG

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